
Contents

An Introduction to Markov Semigroups

<i>Giuseppe Da Prato</i>	1
1 Gaussian Measures in Hilbert Spaces	1
2 Gaussian Random Variables	10
3 Markov Semigroups	17
4 Existence and Uniqueness of Invariant Measures	30
5 Examples of Markov Semigroups	35
6 Bounded Perturbations of Ornstein–Uhlenbeck Generators	47
7 Diffusion Semigroups	55
References	62

Maximal L_p -regularity for Parabolic Equations, Fourier Multiplier Theorems and H^∞ -functional Calculus

<i>Peer C. Kunstmann, Lutz Weis</i>	65
0 Introduction	66
1 An Overview: Two Approaches to Maximal Regularity	69
I. Fourier Multiplier Theorems and Maximal Regularity	83
2 R -boundedness	83
3 Fourier Multiplier Theorem on \mathbb{R}	102
4 Fourier Multipliers on \mathbb{R}^N	120
5 R -bounded Sets of Classical Operators	133
6 Elliptic Systems on \mathbb{R}^n	141
7 Elliptic Boundary Value Problems	154
8 Operators in Divergence Form	176
II. The H^∞ -calculus	196
9 Construction of the H^∞ -calculus	196
10 First Examples for the H^∞ -functional Calculus	208
11 H^∞ -calculus for Hilbert Space Operators	219
12 The Operator-valued H^∞ -calculus and Sums of Closed Operators ..	235
13 Perturbation Theorems and Elliptic Operators	255
14 H^∞ -calculus for Divergence Operators	268

15 Appendix: Fractional Powers of Sectorial Operators	277
References	301

Optimal Control Problems and Riccati Equations for Systems with Unbounded Controls and Partially Analytic Generators-Applications to Boundary and Point Control Problems

<i>Irena Lasiecka</i>	313
1 Introduction	313
I. Abstract Theory	315
2 Mathematical Setting and Formulation of the Control Problem	315
3 Abstract Results for Control Problems with Singular Estimate	325
4 Finite Horizon Problem - Proofs	328
II. Applications to Point and Boundary Control Problems	343
5 Boundary Control Problems for Thermoelastic Plates	344
6 Composite Beam Models with Boundary Control	350
7 Point and Boundary Control Problems in Acoustic-structure Interactions	356
References	366

An Introduction to Parabolic Moving Boundary Problems

<i>Alessandra Lunardi</i>	371
1 Introduction	371
2 The One Dimensional Case	373
3 Basic Examples	379
4 Weak Solutions	380
5 The Fully Nonlinear Equations Approach	382
6 Special Geometries	390
References	398

Asymptotic Behaviour of Parabolic Nonautonomous Evolution Equations

<i>Roland Schnaubelt</i>	401
1 Introduction	401
2 Parabolic Evolution Equations	404
3 Exponential Dichotomy	417
4 Exponential Dichotomy of Parabolic Evolution Equations	435
5 Inhomogeneous Problems	455
6 Convergent Solutions for a Quasilinear Equation	463
References	469